

Electronic supplementary information (ESI)

Two hybrid lanthanides with large magnetocaloric effect and slow magnetic relaxation

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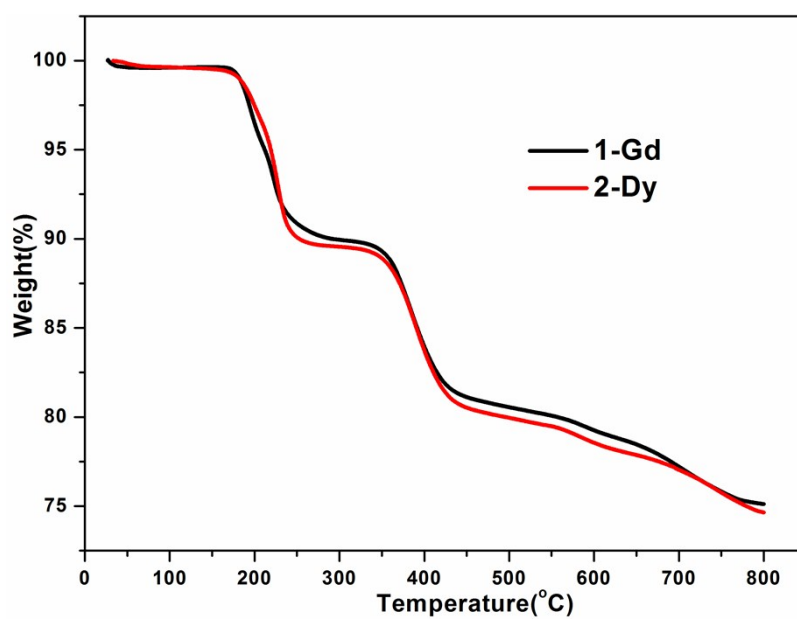


Fig. S1 TGA curves for **1** and **2**.

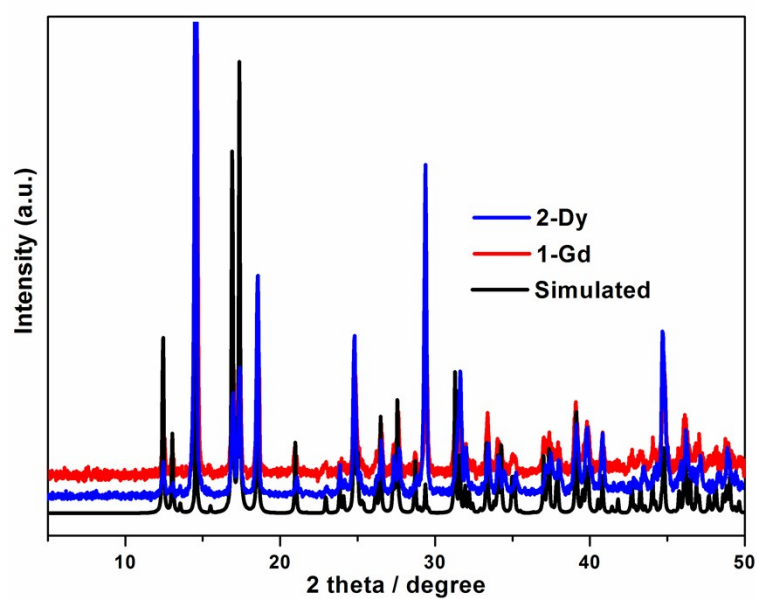


Fig. S2 PXRD patterns of **1** and **2**.

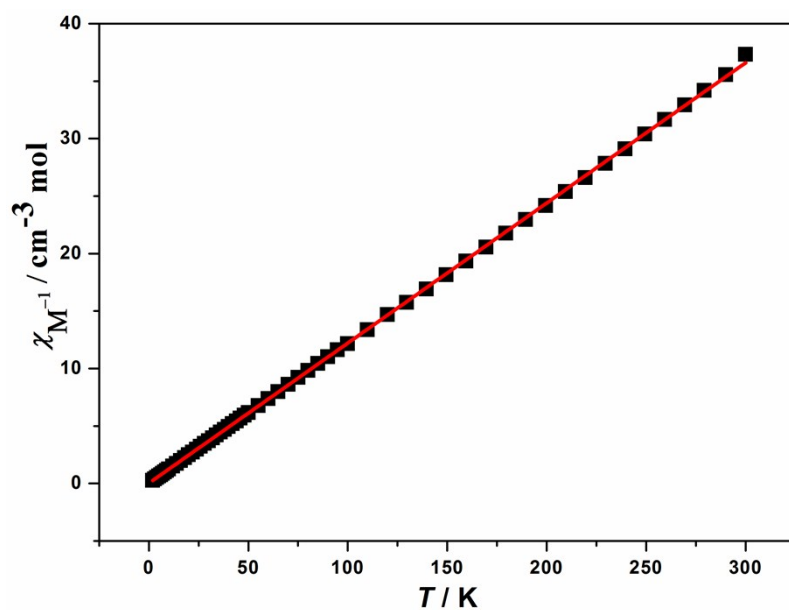


Fig. S3 The χ_M^{-1} vs T plots of **1**. Solid lines represent the Curie-Weiss fitting with the Curie constant $C = 8.20 \text{ cm}^3 \text{mol}^{-1} \text{K}$ and Weiss constant $\theta = -0.22 \text{ K}$.

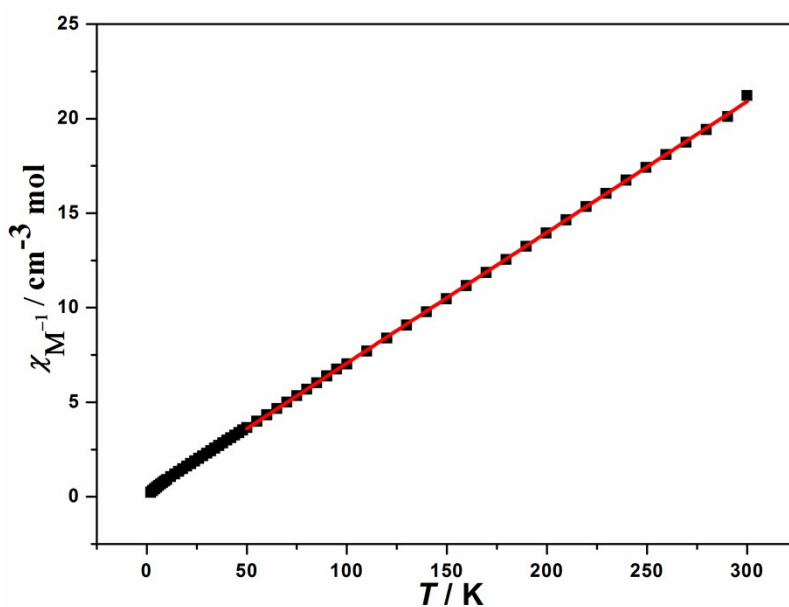


Fig. S4 The χ_M^{-1} vs T plots of **2**. Solid lines represent the Curie-Weiss fitting with the Curie constant $C = 14.45 \text{ cm}^3 \text{mol}^{-1} \text{K}$ and Weiss constant $\theta = -2.05 \text{ K}$.

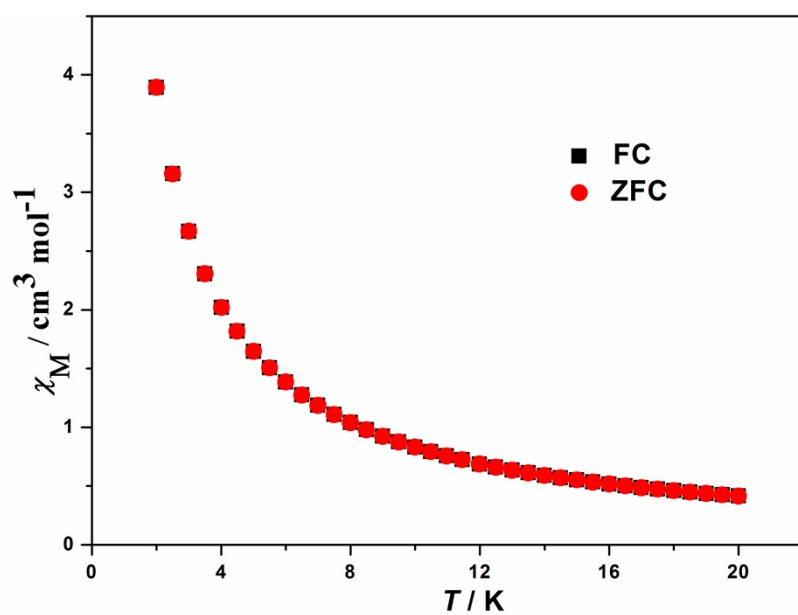


Fig. S5 FC and ZFC magnetization of **1** in the dc field of 50 Oe.

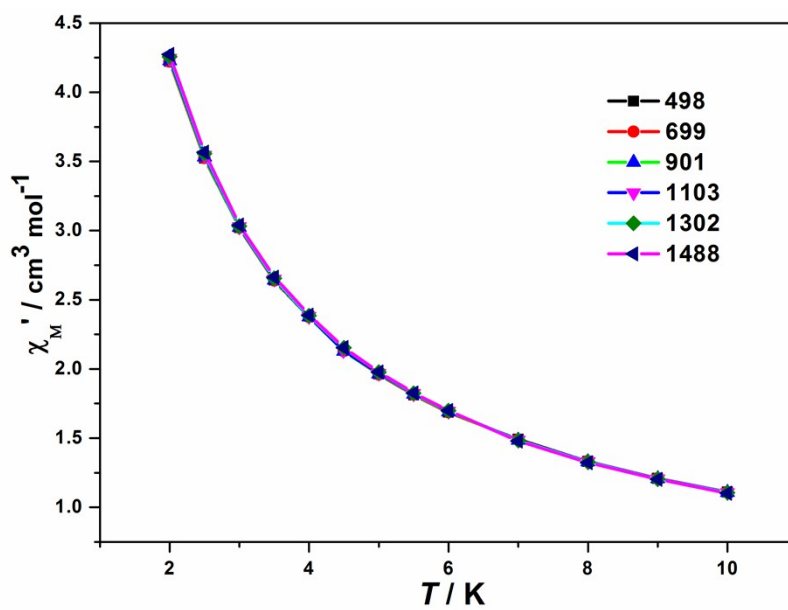


Fig. S6 Temperature dependence of the in-phase (χ') ac susceptibility components for **2** at the indicated frequencies and in zero dc field.

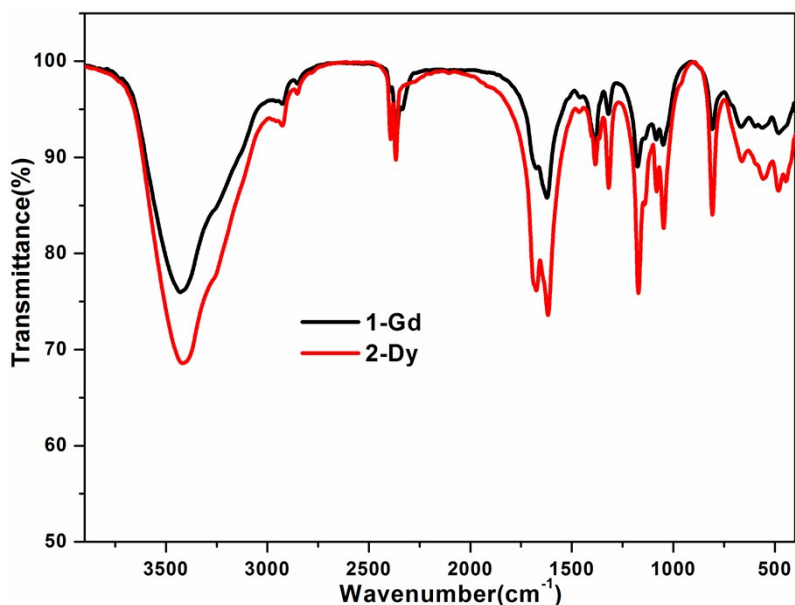


Fig. S7 IR patterns of **1** and **2**.

Table S1. Selected bond lengths (Å) and angles (°) for **1**

Gd(1)-O(6)#3	2.302(6)	Gd(1)-O(3)	2.415(5)
Gd(1)-O(5)	2.341(5)	Gd(1)-O(1)	2.457(6)
Gd(1)-O(4)#2	2.379(6)	Gd(1)-O(2)#1	2.475(6)
Gd(1)-O(8)	2.382(6)	O(5)-P(1)	1.507(5)
Gd(1)-O(7)	2.387(7)	O(6)-P(1)	1.486(5)
O(6)#3-Gd(1)-O(5)	77.9(2)	O(7)-Gd(1)-O(3)	75.63(18)
O(6)#3-Gd(1)-O(4)#2	76.0(2)	O(6)#3-Gd(1)-O(1)	77.5(2)
O(5)-Gd(1)-O(4)#2	105.3(2)	O(5)-Gd(1)-O(1)	153.1(2)
O(6)#3-Gd(1)-O(8)	79.7(2)	O(4)#2-Gd(1)-O(1)	79.1(2)
O(5)-Gd(1)-O(8)	88.4(2)	O(8)-Gd(1)-O(1)	76.6(2)
O(4)#2-Gd(1)-O(8)	148.72(18)	O(7)-Gd(1)-O(1)	115.9(2)
O(6)#3-Gd(1)-O(7)	141.3(2)	O(3)-Gd(1)-O(1)	130.1(2)
O(5)-Gd(1)-O(7)	78.17(19)	O(6)#3-Gd(1)-O(2)#1	137.63(19)
O(4)#2-Gd(1)-O(7)	140.1(2)	O(5)-Gd(1)-O(2)#1	141.66(18)
O(8)-Gd(1)-O(7)	69.6(2)	O(4)#2-Gd(1)-O(2)#1	77.9(2)
O(6)#3-Gd(1)-O(3)	125.28(17)	O(8)-Gd(1)-O(2)#1	108.65(19)
O(5)-Gd(1)-O(3)	74.1(2)	O(7)-Gd(1)-O(2)#1	76.39(19)
O(4)#2-Gd(1)-O(3)	67.64(17)	O(3)-Gd(1)-O(2)#1	72.12(18)
O(8)-Gd(1)-O(3)	143.62(18)	O(1)-Gd(1)-O(2)#1	65.15(18)

Symmetry codes: #1: -x+1, -y+1, -z+1; #2: -x, -y+1, -z+1; #3: -x, -y, -z+1.

Table S2. Selected bond lengths (Å) and angles (°) for **2**

O(1)-Dy(1)	2.438(8)	O(5)-Dy(1)	2.331(6)
O(2)-Dy(1)#1	2.475(7)	O(6)-P(1)	1.492(6)
O(3)-Dy(1)	2.407(7)	O(6)-Dy(1)#3	2.295(6)
O(4)-Dy(1)#2	2.375(7)	O(7)-Dy(1)	2.381(7)
O(5)-P(1)	1.520(7)	O(8)-Dy(1)	2.373(7)
O(6)#3-Dy(1)-O(5)	78.1(3)	O(7)-Dy(1)-O(3)	75.4(3)
O(6)#3-Dy(1)-O(8)	79.3(3)	O(6)#3-Dy(1)-O(1)	77.0(3)
O(5)-Dy(1)-O(8)	87.0(3)	O(5)-Dy(1)-O(1)	152.4(2)
O(6)#3-Dy(1)-O(4)#2	76.1(3)	O(8)-Dy(1)-O(1)	77.0(3)
O(5)-Dy(1)-O(4)#2	106.5(3)	O(4)#2-Dy(1)-O(1)	78.7(3)
O(8)-Dy(1)-O(4)#2	148.6(2)	O(7)-Dy(1)-O(1)	116.0(3)
O(6)#3-Dy(1)-O(7)	141.4(2)	O(3)-Dy(1)-O(1)	130.4(2)
O(5)-Dy(1)-O(7)	77.9(3)	O(6)#3-Dy(1)-O(2)#1	137.7(3)
O(8)-Dy(1)-O(7)	69.7(2)	O(5)-Dy(1)-O(2)#1	141.7(2)
O(4)#2-Dy(1)-O(7)	140.1(2)	O(8)-Dy(1)-O(2)#1	109.4(2)
O(6)#3-Dy(1)-O(3)	125.7(3)	O(4)#2-Dy(1)-O(2)#1	77.7(3)
O(5)-Dy(1)-O(3)	74.8(3)	O(7)-Dy(1)-O(2)#1	76.1(2)
O(8)-Dy(1)-O(3)	143.3(2)	O(3)-Dy(1)-O(2)#1	71.7(3)
O(4)#2-Dy(1)-O(3)	68.1(2)	O(1)-Dy(1)-O(2)#1	65.7(2)

Symmetry codes: #1: -x+1, -y+1, -z+2; #2: -x+2, -y+1, -z+2; #3: -x+2, -y, -z+2.